

WEB PROCESSING MECHANISM FOR FORMING PACKAGES

TECHNICAL FIELD

This invention relates to machinery that form packages from a web of thermoset material and more particularly it relates to packaging machinery having a web processing mechanism for grasping, sealing and cutting said web for forming packages of various characteristics as the web is passed therethrough.

BACKGROUND ART

Packaging machines forming packages from a web are well known in the art. Representative examples of this art are the U.S. Pat. Nos. 3,544,340, Dec. 1, 1970, R. E. Miller et al., and 3,988,970, Nov. 2, 1976, Hanson et al. Such machines also are commercially available as for example the form-fill-seal packaging systems manufactured by Sigma Systems, Inc., 231 Westhampton Place, Capitol Heights, Md. 20027, which form from plastic web various packages for sealing in products such as hardware, candy, peanuts, etc., which may be counted out to assure each package has a known number of pieces.

At the heart of these machines is the mechanism for processing the packages by sealing the products in the packages during formation from the web and cutting the web to form individual or sets of packages. The operation and controls of such package forming and web processing mechanisms is critical to the automatic packaging machinery concept. Thus, the ideal mechanisms of this type need be foolproof, reliable over many cycles of operation, compatible in size and shape for mounting in a system, controllable to make packages of various size and characteristics, simple in construction, low in cost, and operable with little power. Also they should be adaptable for simplified controls in an automated system to vary package parameters.

Typical of web cutting machines are U.S. Pat. Nos. Re. 17079, Sept. 11, 1928, J. Hahn, 1,667,184, Apr. 24, 1928, M. H. Ballard and 4,054,075, Oct. 18, 1977, J. Doorak. However, these and other prior art machines do not provide the reliability, speed, flexibility and comprehensiveness of operation in an automated packaging system that need be adaptable for various packaging conditions, nor are they simple and low in cost.

BRIEF DISCLOSURE OF THE INVENTION

Therefore the present invention provides a simple inexpensive and adaptable automatic packaging system incorporating a simplified and efficient mechanism for processing a continuous web to form the packages, seal products therein, and to sever packages from the end of a continuous web from which they are formed.

Accordingly, a mechanism is afforded operable upon demand as programmed to automatic packaging system requirements, and providing significant operating force from a low power reciprocating member such as a hydraulic piston to open and close jaws in contact on opposite sides of a movable web. The mechanism incorporates a simple linkage coupled to a rocker member movable over an arc less than 360° to move jaw assemblies in opposite directions. This is accomplished by means of two links on opposite sides of the rocker member which move into substantially a straight line on opposite sides of the rocker member to reach an ultimate dead center position for contact with the web at

high force. This feature permits great closing power from a modest prime mover power and uses few parts taking up little space.

Coupled to the jaws are heat sealing members if thermoset plastics are being processed, and programmable knife cutting means for severing the web between packages either individually or in sets of two or more. Thus, the single simple jaw operating mechanism serves the multiple function of grasping and moving the web, sealing it into a package and cutting the package from the web as programmed in a single unit or in sets.

Additionally are provided features such as safety means for preventing damage to the machinery or a foreign object if it gets in the path of the jaws. Thus, upon intervention of an object between the jaws in the jaw closing cycle such as a hand the jaws are opened. The mechanism is well adapted for making different size packages and for filling efficiently with various products in a fast automated packaging system.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a diagrammatic view in perspective, of a package processing system afforded by this invention for processing a web to form and fill packages;

FIG. 2 is a perspective exploded view of a package processing mechanism afforded by this invention to move a pair of jaws for engaging the web in the package forming process;

FIG. 3 is a perspective exploded view of a typical assembly of web processing devices assembled on the movable jaws of the mechanism of FIG. 2;

FIGS. 4A and 4B are schematic representations of the jaw movement mechanism showing its operational mode respectively in positions with the jaws open and closed to grasp the web;

FIG. 5 is a segmented view, partly in section, to show a safety feature attached to the movable jaw mechanism to prevent jaw closure in the presence of a foreign object in the travel path; and

FIG. 6 is a block diagram schematic control system showing the operational features of the package processing mechanism of FIGS. 2 to 5 as it relates to and operates in an automatic packaging system such as shown in FIG. 1.

PREFERRED MODE FOR CARRYING OUT THE INVENTION

The packaging system as shown in FIG. 1 has a web 9 fed from roll 10 around a dancing or metering roller 10 and a roller array 12 to proceed past a printing station (not shown) for imparting a print to the web at a position controlled by registration bar 13 and photocell 14. The printed web is then fed over web forming and product feeding tube 15 through the longitudinal sealer 16 which seals together the web edges to form a web tubing 15 from a counter-feeder device (not shown) which is synchronized for operation with the packaging cycle.

Before the products are fed into the web tubing, the web is closed transversely at the bottom to retain the products by operation of the package processing mechanism 17 contained in and operable with a web advancing carriage mechanism 18, which pivots one end portion up and down along the web feed axis 19 oriented downwardly from feeder tube 16. This web advancing carriage mechanism 18 is vertically adjustable in slot 20